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**The Response to Threat:
Relations among Verbal and
Physiological Indices**

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Psychological Monographs: General and Applied

THE RESPONSE TO THREAT:
RELATIONS AMONG VERBAL AND PHYSIOLOGICAL INDICES¹

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THE psychophysiology of emotion has intrigued American psychologists at least since James' pronouncements on the subject, and recently the psychological reaction to threat or stress has become an important part of the research endeavor of contemporary psychology. Surprisingly little work has been done, however, on the empirical relation between physiological and psychological indices of reaction to threat. We do have extensive studies of visceral response to psychological stress (e.g., Lacey, Bateman, & Van Lehn, 1953; Wenger, Engel, & Clemens, 1957), of the effects of stress on performance (cf. Lazarus, Deese, & Osler, 1952), of the effects of threat on verbal disorganization (cf. Rapaport, Gill, & Schafer, 1945), of the relation between general emotional disturbance and physiology (Altschule, 1953), and of the relation between self-rating scales and physiology (e.g., Raphelson, 1957). Considering, however, the relative emphasis on both physiology and verbal behavior in the current literature there is a surprising paucity of material relating indices of verbal disturbance elicited by threat to concomitant physiological changes.

When such investigations have been undertaken they have been hampered by the lack of a standardized method for eliciting complex verbal behavior on the one hand and by an almost exclusive reliance on the

ubiquitous galvanic skin response on the other. For example, Hsü (1952) in the course of an extensive factor analysis of both PGR and verbal evaluative reactions to "emotional" words concluded that the two approaches "gave rise to collaborating, but not identical, results." The correlations between verbal responses and PGR responses on the specific stimuli reported vary from .16 to .46; the correlation matrix of four factors derived from the PGR data and two factors derived from the rating data shows correlation coefficients varying from .15 to .38. More recently Blum (1960)—using the Blacky test—demonstrated another relation between verbal and physiological indices of anxiety. A factor analysis of variables indicating anxiety potential demonstrated a primary factor with loadings on absent or minimal verbal output and on resistance drops during periods of no verbal output.

It should be noted that in the Hsü study the verbal data called for ratings by the subjects of degree of emotional disturbance elicited by the stimulus words—a procedure frequently used also in earlier studies of the PGR. Such a procedure requires the subject to *rate* his own emotionality; it does not measure emotional behavior. The major question to which we want to address ourselves here is the relation between physiological and verbal indices of disturbance, anxiety, or emotionality, rather than subjects' evaluations of, or reactions to, their own emotional states.

In order to arouse emotional disturbance we have made use of a new research instrument developed by Heath (1960). The Phrase Association Test (PT) presents the subject with a series of phrases dealing with

¹ This study was supported by a grant from the Foundations Fund for Research in Psychiatry and by Grant M-2442 from the Institute of Mental Health, United States Public Health Service. It was completed while the senior author was a Fellow at the Center for Advanced Study in the Behavioral Sciences.

a variety of conflictual material. The subject is instructed to respond to these phrases with the first phrase or association that comes to mind (Heath, 1960).

Although an offspring of the Word Association and Sentence Completion Tests, the PT attempts to avoid the limitations of these and other unstructured tests by its systematic use of replicated highly structured stimulus phrases, minimal instructional and structural constraints on the associative response, and an economical, objective, and quantitative scoring system for measuring behavioral indices of defensive behavior (p. 166). (Quoted by permission of the Journal Press)

It permits the evaluation of verbal activity in respect to specific areas of conflict—corresponding to the content of the phrases. The use of phrases, rather than words, narrows the latitude of definition and meaning of the stimulus and focuses arousal into more specific and more easily analyzable areas. While restricting and controlling the stimulus material, the test, by requiring subjects to respond in phrases rather than in single associations, broadens the kind of behavior elicited and permits wider areas of analysis of verbal defensive behavior. Thus, Heath has developed a 22-item checklist for scoring subjects' verbal productions in response to the PT. We have used in the present investigation a 29-item list (cf. Appendix C) divided into five areas of response modes. This scoring system concentrates on cognitive defensive activity and is primarily focused on verbal behavior. While the analysis of verbal behavior is clearly applicable to some of the classical defense mechanisms (such as denial and intellectualization), it fails to deal with others such as repression, suppression, and reaction formation. However, within the area of verbal reactions to threat it has a range of inclusion which, while narrower than the usual classifications, is directly appropriate to the material obtained from our subjects and may, in fact, have wider applications to other kinds of verbal behavior elicited under different conditions.

At the physiological level we have avoided a restriction to a single measure of response. Rather we have collected, concomitantly to the subjects' verbal response to the stimulus phrases, data on heart rate, skin tempera-

ture, peripheral blood flow, as well as the galvanic skin response.

Two separate studies were conducted. In Study I we were concerned with the relation between verbal and physiological indices of response to the PT. Upon completion of this study it was decided to revise the list of phrases and to undertake a separate replication of the verbal behavioral findings of the first investigation. Consequently, Study II used an amended and expanded PT and no physiological measurements. A group Rorschach was also given to these subjects.

Before stating the specific questions to which we want to address the investigation one reminder is appropriate. We have pointed out previously (Mandler, 1959) that psychological studies of individual variation and of stimulus variation are logically disparate efforts. Thus, questions about the relation among variables when values on these variables are associated with individual subjects are different from questions about covariation when values are associated with stimuli or situations. In our discussion, therefore, these two approaches will be kept distinct.

While our primary concern in the present investigation will be with the description of significant variations in subject and stimulus differences on several indices of response to threat, some of the specific questions to be asked can be outlined briefly:

1. The verbal response to threat—

- a. How do subjects differ in degree of response to various areas of threat, in mode of response, and in the relation between these two? Do subjects respond consistently from one area of threat to another or is there a differential use of response modes depending on the stimulus material?

- b. Can stimuli be ordered meaningfully according to the degree to which they elicit signs of verbal disturbance? Do specific types of stimuli tend to elicit specific types of response modes?

- c. Is the response to threat in the Phrase Association Test related to the perception of threatening material on the Rorschach?

2. The physiological response to threat and its relation to verbal indices—

a. What is the relation between subjects' perception of visceral activity (autonomic feedback) and their performance on the Phrase Association Test?

b. What is the relation among three general indices of anxiety: Physiological activity, self-report of anxiety, and verbal disturbance?

c. What is the relation among individual differences in degree of physiological activity, sensitivity to particular threat areas, and preferential use of specific response modes?

d. Do stimuli differ significantly in the degree to which they elicit physiological arousal? How is this function of stimuli related to their tendency to elicit differential verbal disturbance?

METHOD

This investigation consists of two studies. In Study I, 32 subjects were presented with 18 phrases and their verbal and physiological reactions were recorded concomitantly. In addition, these subjects were given paper and pencil self-rating scales of anxiety and visceral perception. In Study II, 28 subjects were presented with 40 phrases and their verbal reactions were recorded. These subjects were also given a group Rorschach test.

The Phrase Association Test (PT)

The general rationale for the PT has been described above; it only remains to describe in detail the particular stimuli and scoring systems used in our studies.

In Study I, 18 phrases adapted from Heath (1956) were used; they cover four content areas: Neutral, Aggression, Sex, and Dependency. There were 6 neutral phrases and 4 in each of the other areas. These phrases are shown in Appendix A. It will be noted that the threat phrases deal with a variety of conflictual materials in these areas and use both humans and animals as main characters. The neutral phrases were designed to elicit no conflict in themselves; they do permit an evaluation of the subjects' general level of disorganization in our particular situation.

In Study II, a total of 40 phrases were used, 8 in each of the following areas: Neutral, Sex, Ag-

gression, Dependency, and Competition. Only 9 of the phrases were identical with those used in Study I and the new phrases were designed with special reference to the student population used in our studies. Thus, the addition of the Competition category was prompted by the belief that this might be a significant area of conflict or threat for Harvard college students. The phrases are shown in Appendix B.

In developing a scoring system for the subjects' verbal productions we were guided by two considerations: first, we wanted to make use of the scoring system which Heath had shown to be useful for the evaluation of conflict areas in a hospital population (Heath, 1956); and second, we wanted to expand it to be most sensitive to nuances of verbal behavior and to be theoretically meaningful in terms of possible reactions to threat. The final checklist (see Appendix C) contained 29 items divided into five modes of response: four of these modes vary along the dimension of degree of acceptance of or involvement with the stimulus material; the fifth is an index of behavioral interference.

Stimulus Avoidance. The most aloof type of response the subject can make to the stimulus phrases consists of an attempt to avoid the task and stimulus entirely. He can refuse to see it; he can try to leave the field. In terms of verbal reactions he can give no response, merely repeat the phrase, discuss the experimental equipment, and so forth.

Recoding or Denial. In a manner somewhat similar to the physical avoidance of a stimulus, a subject can psychologically avoid it by a number of means. He can accept the stimulus qua stimulus material but then proceed to change its meaning in a variety of ways, or he can deny the validity or implications of its content. In terms of verbal response he can misinterpret the meaning of the phrase, deny its truth, evade the main theme, and so forth. In contrast to the Avoidance category the subject does react to the stimulus, but he does not explicitly accept its meaning.

Rationalization, Neutralization, and Intellectualization. Further along the dimension of involvement a subject can accept the meaning of a stimulus while at the same time handling it in an impersonal fashion. Verbal responses in this category include normative statements which imply that the content of the phrase is not unusual, justifications of the meaning of the phrase by the elaboration of causes and motives, and so forth.

Personalization (personal involvement). At the extreme of involvement with the stimulus material the subject can respond to the phrase without any attempt to alter its meaning and by referring the content to his own experiences and value systems. In terms of verbal behavior he refers to himself in his response, elaborates the content in terms of value judgments, and so forth.

Interference. This measure of behavioral interference includes indices which point to a general

breakdown in the subject's ability to handle the stimulus material. It includes stuttering, laughter, long reaction times, and so forth.

In Study I the subjects' responses were tape recorded, subsequently transcribed, and scored. In Study II the responses were directly recorded by the experimenter and then scored from the protocols. In scoring these verbal productions, each response received a score equal to the sum of the appropriate items checked on the 29-item list.

There are two possible approaches to the problem of reliability: one would show a reliability coefficient computed for the total scores given by two judges to a number of protocols, the other investigates the agreement between the two judges on the actual signs checked for a number of protocols. We chose the latter, more stringent, criterion for our present investigation and computed percentage agreement for two scorers on all protocols according to the formula: twice the number of agreements divided by the sum of all indices checked by the two scorers. The results were: in Study I, 77%; in Study II, 75%. This level of agreement is consistent with Heath's (1960) figures of 68% and 77% for two similar reliability studies. Heath also reports reliability coefficients on the same data of .94 and .95 for total PT scores.

In summary, this scoring method provided us with scores for each subject for each area of threat, for each mode of response across all stimuli used, and a total disturbance score.

Physiological Measures

Physiological recording was accomplished with a modified Grass six-channel polygraph described in a previous article (Mandler, Mandler, & Uviller, 1958). Temperature and humidity in the experimental room were controlled; the mean temperature for the 32 sessions in Study I was 72.2°F. ($SD = 2.1$), the mean relative humidity was 40% ($SD = 6$). Measures were taken on heart rate (with a Grass cardiograph), peripheral blood flow (by means of a Waters oximeter), finger temperature (by means of a Yellow Springs telethermometer), and palmar galvanic skin response (by means of a Yellow Springs dermohmmeter). Within each of these channels the following indices were obtained for each subject:

Heart Rate:

1. The mean of the five fastest beats during the 15 seconds after the onset of stimulus was computed. Of the 18 mean values for each subject, the highest value was corrected for heart rate base level during the minute preceding the start of stimulus presentation by the method suggested by Lacey (1956). The resultant autonomic lability score (ALS) is the first heart rate measure (EKG_1).

2. The highest raw value determined as above is our second heart rate measure (EKG_2).

3. The mean five fastest beats during the 15 seconds before and the 15 seconds after the onset of each stimulus were computed. For each subject the mean value for all 18 stimuli was computed and the difference between these two values is the third heart rate measure (EKG_3).

Galvanic Skin Response:

1. An ALS score was computed similar to the first heart rate measure, representing the highest conductance value for each subject regardless of which stimulus elicited it and corrected for base conductance prior to stimulus presentation (GSR_1).

2. For each stimulus we computed the difference in log conductance between the level at stimulus onset and the highest level obtained after stimulus onset. For each subject we computed the mean of these 18 values (GSR_2).

Peripheral Blood Flow:

1. For each stimulus presentation we counted the number of discriminable changes in direction during the 30-second presentation of the stimulus. For each subject the measure is the mean of these 18 values (BF_1).

2. For each subject we measured the largest increase in blood flow for each stimulus and computed the mean for each subject (BF_2).

3. For each subject we measured the largest mean drop in this index similar to BF_2 (BF_3).

Finger Temperature:

1. For each subject we measured the size of the largest continuous rise in finger temperature for each stimulus. Our first temperature measure is the mean of these values (T_1).

2. Similar to T_1 we measured the largest drop in finger temperature (T_2).

3. T_1 or T_2 whichever was larger for that particular subject (T_3).

For each stimulus phrase we computed the following physiological measures:

Heart Rate:

1. The difference between the means (for all subjects) of the five fastest heart beats 15 seconds before and 15 seconds after stimulus onset (EKG_{18}).

2. Similar to EKG_{18} except that the five fastest beats between 16 seconds and 30 seconds after onset were used (EKG_{28}).

Galvanic Skin Response:

1. The mean change in conductance as determined for GSR_2 above, but averaged across subjects (GSR_{18}).

Peripheral Blood Flow:

1. The mean number of changes in direction (as computed for BF_1) for each stimulus (BF_{18}).

2. Similar to BF_2 . Mean value of the largest rise in this index (BF_{28}).

3. Similar to BF_3 . The mean value of the largest drop in this index (BF_{38}).

Finger Temperature:

1. Similar to T_1 . The mean of the largest increases in temperature across subjects (T_{1a}).
2. Similar to T_2 . The mean of the largest decreases in temperature across subjects (T_{2a}).

Rating Scales, Interviews, and Group Rorschach

The subjects in Study I, in addition to the PT and the physiological measures, were given the Autonomic Perception Questionnaire (APQ)² described elsewhere (Mandler, Mandler, & Uviller, 1958) and the Manifest Anxiety scale (MA) developed by Taylor (1953). The APQ measures the subject's general awareness of bodily and visceral reactions during periods of stress or displeasure. Immediately following the presentation of the PT these subjects were also interviewed with the aid of a standard set of questions concerning their awareness of bodily and visceral processes in the course of the experiment. The responses to 10 items of this interview were scored on a 0, 1, and 2 scale ranging from no awareness to marked awareness of such reactions. The sum of these scores represents our Interview scale. Scores on this scale ranged from 1 to 14 with a mean of 7.4 ($SD = 3.1$).

The subjects in Study II were given a group Rorschach subsequent to the PT administration. They were given standard instructions; the Rorschach cards were presented by means of a slide projector and subjects wrote their responses in an answer booklet. Each Rorschach response was scored for the presence or absence of latent or manifest imagery in each of the four conflict or threat areas used in Study II (see Appendix D for the scoring manual). The reliability of this scoring scheme was determined by percentage agreement between two scorers as for the PT; agreement was 73%.

Subjects

The subjects in both studies were Harvard College undergraduates who volunteered for the investigation and were paid at the rate of \$1.00 per hour. They were primarily freshmen and none of the subjects had any prior experience with experiments in the personality field. The mean age of the

subjects in Study I was 18.0, in Study II it was 18.6.

Procedure

The subjects in Study I originally signed up for a group testing session in which they were given the APQ and MA. They were then seen in individual sessions where the PT was administered. At the beginning of this session each subject was told that the study was concerned with the investigation of physiological reactions in response to a variety of different stimulus materials. After electrodes had been attached the subject was given an adaptation period of no less than 20 minutes. At the conclusion of that period he was given instructions for the PT:

I am going to show you a phrase or sentence projected on the wall in front of you. I want you to say the first phrase or sentence that comes to mind. Any phrase or sentence will do, but say the first phrase that comes to mind as quickly as you can. This is to see how quickly you can react. Between each presentation there will be a short interval. Be sure to give the first phrase that comes to mind and to speak clearly.

The subject was also reassured that we were not interested in his personal reactions, but rather that the data collected would form part of a large research project. After 2 practice phrases the 18 phrases were presented by means of a slide projector which exposed a phrase every 60 seconds. Following the subject's response the stimulus phrase was removed and the subject faced a blank screen until the next phrase appeared. The order of phrases was randomized for each subject with the restriction that the first and last phrase was a neutral phrase and that the other phrases were presented in such a manner that each consecutive block of four phrases contained one phrase each from the four areas: Neutral, Aggression, Sex, and Dependency. In addition a blank slide was presented following the first, ninth, and seventeenth phrase in order to check on the possibility of a conditioned physiological response to the projector noise and stimulus change. The procedure was interrupted only if the subject gave three consecutive one-word responses in which case he was prompted to respond with phrases. Following presentation of the PT each subject was given the interview described above.

In Study II the procedure was identical except that no physiological measures were taken and no interview was given. A different experimenter administered this study. The randomization of phrases was similar to that in Study I; however, with five phrase topics the restriction on blocks was changed accordingly. Following the PT session the subjects in Study II signed up for one of two group Rorschach sessions which were conducted ostensibly as part of a different research project and were given by a different investigator.

² A copy of the Autonomic Perception Questionnaire and scoring instructions have been deposited with the American Documentation Institute. Order Document No. 6764 from ADI Auxiliary Publications Project, Photoduplication Service, Library of Congress; Washington 25, D. C., remitting in advance \$1.75 for microfilm or \$2.50 for photocopies. Make checks payable to: Chief, Photoduplication Service, Library of Congress.

RESULTS AND DISCUSSION

Individual Differences in Response to Threat Areas and in Modes of Response

We are first interested in the relations among the threat areas and the use of the various response modes. As far as subjects' responses to the various areas are concerned, we are asking whether a subject who scores relatively high in one area will also score relatively high in other areas. The relevant correlation matrix for both studies is presented in Table 1. It can be seen that all correlations are positive, indicating that the tendency to score high is general across areas. However, while all the correlations in Study I reach statistical levels of significance, this is not the case for Study II.

The most striking finding concerns the relatively high correlations between Neutral and the other areas. Since Neutral phrases as a whole received much lower scores than the threat areas (see below) this finding argues for a general disturbance factor in the subjects' response to the task. Subjects who score high on the threat areas also show more anxiety to the neutral phrases, even though the latter do not generally tend

to arouse a high degree of disturbance. Thus, it is likely that a subject's over-all anxiety level in response to the task may be more important in determining degree of response disorganization than specific anxiety reactions aroused by some particular subject matter.

The remaining intercorrelations are of minor interest since they presumably only reflect differences in the phrases used in the two studies. There does seem to be less of a generality factor in Study II than in Study I; fewer of the intercorrelations reach statistical significance. Thus, Sex shows no significant correlations with any other area, while Competition is significantly, and not surprisingly, related only to Dependency. Thus, in Study I there is less of a differential response to various areas than in Study II. This greater differentiation among areas is borne out by the analysis of stimulus differences discussed below.

Another approach to the problem of individual differences in response to these areas is to determine the number of subjects who "choose" each area as their area of major conflict or disturbance. Excluding several ties in both studies, i.e., cases where subjects received identical scores in more than one area, the distribution looks as follows:

TABLE 1
PRODUCT-MOMENT CORRELATIONS AMONG AREAS
FOR BOTH STUDIES

Content area	Aggression	Sex	Dependency	Competition
Neutral: Study I (N=32)	.589***	.481***	.366*	
Study II (N=28)	.555***	.336	.601***	.355
Aggression: Study I		.521***	.392*	
Study II		.157	.461**	.311
Sex: Study I			.561***	
Study II			.128	.308
Dependency: Study I				.570***
Study II				

* $p < .05$.
** $p < .02$.
*** $p < .01$.

	NEUTRAL	AGGRESSION	SEX	DEPENDENCY	COMPETITION
Study I	0	7	8	10	-
Study II	0	7	9	3	2

These data provide one validation index for the PT. No subject had his highest score in the Neutral area, thus arguing for the effect of threat content on the disturbance scores. Apart from the discrepancy on the Dependency dimension the studies distribute areas of conflict fairly evenly among subjects, and the differences between the two studies can be ascribed to differences in the phrases used.

A more general analysis of the PT disturbance score and one which should not be affected by differences in phrase content between the two studies concerns the relations among the five modes of response. The pertinent intercorrelations are shown in Table 2.

TABLE 2
PRODUCT-MOMENT CORRELATIONS AMONG RESPONSE
MODES FOR BOTH STUDIES

Mode of response	Re-coding	Rationalization	Personalization	Interference
Avoidance: Study I (N=32)	.232	.112	.215	.442**
Study II (N=28)	-.030	.091	.154	.419*
Recoding: Study I		-.437**	.177	.004
Study II		-.428*	-.258	-.178
Rationalization: Study I			-.027	.302
Study II			-.044	.182
Personalization: Study I				.285
Study II				.189

* $p < .05$.

** $p < .02$.

The agreement between the two studies is excellent. Of 10 correlations the same 2 are statistically significant in both studies and surprisingly similar in magnitude. This result constitutes a partial reliability and validity check of the scoring system: two groups of subjects presented with different stimuli show similar relationships in the way they respond to or handle threat.

The first significant correlation to note is that between Avoidance and Interference. While Interference indicates some breakdown in defensive and coping activity on the part of the subject, Avoidance is probably the most pervasive and primitive type of defensive maneuver. It seems reasonable that subjects who show extreme disorganization, as measured by the Interference category, will also tend to be most likely to avoid the task altogether and to try to escape from the requirements of the situation. A subject's difficulty in handling the task can be expressed in both of these two modes.

The other important correlation is the negative one between Recoding and Rationalization. In our rationale for the scoring system we suggested that while Recoding implies the denial of meaning of the phrase,

Rationalization as a mode of response accepts the meaning of the phrase but intellectualizes it. It appears from the present data that these two modes of response are actually alternative modes of handling material such as that used in these studies. A subject who uses one of them does not tend to use the other. We may be encountering here a personality difference related to such concepts as leveling and sharpening or vigilance and defense.

It should be noted that we had expected Personalization to be related to Recoding in a somewhat similar manner as Rationalization. Our data do not bear this out and while Personalization seems to be a mode of response independent of Recoding and Rationalization it is not alternative to either of them. Subjects may or may not use it and the other two modes independently.

The next question we may ask is about the differential use of response modes. Do subjects tend to concentrate on one particular kind of mode or defense or do they use these response types indiscriminately? First, we look at the distribution of the various response modes for the population at large to examine the proportion of disorganization signs which fall into each category:

	AVOID- ANCE	RE- CODING	RATIONAL- IZATION	PERSONAL- IZATION	INTER- FERENCE
Study I	12%	27%	24%	21%	16%
Study II	11%	23%	22%	27%	18%

The agreement between the two studies is quite remarkable and what discrepancy there exists may be due to the elimination of phrases with animal content in Study II, phrases which may have decreased the number of Personalization responses. If we use these figures as the average or expected use of these modes of response, we may now examine the concentrations of signs within particular modes for individual subjects. Looking at the percentage of disturbance signs falling into each subject's most frequently used mode, we find in Study I a mean of 37% (range 24-76%), in Study II a mean of 40% (range 25-58%). Thus the mean concentration of signs, as well as the range, is quite markedly above the concentration for the population, i.e., the average subject. This indicates that different sub-

jects concentrate their responses in different response modes. However, no subject uses a single mode exclusively, the maximum concentrations being 76% and 58%, respectively. As a further step we established an arbitrary index of major concentration of response signs, i.e., a concentration of 40% or more (the population mean of concentration) of all signs into a single response mode. Using this criterion we find that 7 subjects in Study I and 12 subjects in Study II have a major response mode. In Study I, 4 of these subjects concentrated on Recoding and 3 on Rationalization; in Study II, 4 subjects concentrated on Recoding, 3 on Rationalization, and 5 on Personalization. Thus a sizable number of subjects (32% in both studies combined) concentrate on a single mode of response. It should be noted that none of these subjects shows any concentration in either Avoidance or Interference. This substantiates our initial assumption that these two categories should be differentiated from the other three which can more properly be called defensive modes. Avoidance and Interference are indices of response to the task at large.

The final question we may ask about individual differences on the PT concerns the relation between threat areas and modes of response. An examination of the data on subjects' concentration of response mode showed no apparent tendency for subjects to shift type of response according to the area being tapped. Another approach to the same question used the correlations between subjects' scores on areas and their scores on the response mode categories. It was found that most of these correlations were significant because of the large amount of variance being contributed by total PT scores. In order to control for this factor, partial correlations were computed between areas and modes holding total PT score constant. The resulting matrices for the two studies (of 20 partial correlations for Study I and 25 for Study II) resulted in only a few significant relationships. In Study I the partial r between Aggression and Avoidance was .463 ($p < .01$), while the same correlation for Study II was .211. Similarly the

partial correlation between Neutral and Interference was $-.420$ ($p < .02$), for Study II $-.295$ ($p < .10$); between Neutral and Personalization it was .435 ($p < .02$), for Study II $-.060$. Finally the partial correlation between Sex and Interference in Study II was .519 ($p < .01$), in Study I .160. Considering only those relationships which were confirmed in direction by the other study we can say that: (a) Subjects who are high on the Interference scale show little disturbance on the Neutral phrases. (b) Subjects who are high on the Avoidance mode also show more disturbance in the Aggression area. (c) Subjects who are high on the Interference scale are high in the Sex area.

The last two findings suggest that subjects who react with more anxiety to the areas of Sex and Aggression also show more use of the response modes which indicate generalized disturbance. We shall have occasion to return to these findings in connection with some of the physiological indices.

Stimulus Differences in Verbal Disturbance

We may now ask how well the 18 stimuli are differentiated in terms of degree of disturbance and type of response which they evoke.

Table 3 shows the mean number of signs associated with the various areas, and Table 4 presents the relevant analyses of variance. As a further validation of the PT, the Neutral phrases elicit fewer signs than do the threat areas. The analyses of variance show a significant source of variance to be associated with areas in both studies. An analysis of the area means with Tukey's gap test permits the further statement that in Study I the Neutral phrases are significantly different from the threat phrases, but that no statistically significant differences exist among the threat groups. In Study II a finer distinction can be made since the Neutral phrases show a significantly low mean phrase score, followed by the Competition and Dependency areas, which are in turn significantly lower than the Sex and Aggression areas. This substantiates the

TABLE 3
MEAN NUMBER OF SIGNS ELICITED BY THE
PHRASE AREAS IN BOTH STUDIES

Study	Neu- tral	Aggres- sion	Sex	De- pend- ency	Com- peti- tion
I	33	58	57	64	
II	22	38	37	30	30

point made earlier that in Study II the various areas were better differentiated than in Study I.

The question might be asked why the Neutral phrases show any disturbance signs at all. It should be remembered that the phrases were presented in a quasirandom order and that we have suggested generalized anxiety reactions to the task as a whole. Furthermore, the signs described in our scoring manual cover a very broad range of possible responses with a great likelihood that even a truly "neutral" phrase will receive scores larger than zero. This possibility has permitted us to estimate subjects' habitual ways of responding to verbal stimuli.

The mean differences among areas shown in Table 3 should again be ascribed to the different kinds of phrases used in the two studies. It is interesting to note though that

the mean scores on Study II are generally lower than in Study I. Two possible explanations can be advanced for this phenomenon. The experimental situation in Study I, including elaborate physiological measurement equipment, was probably more anxiety arousing than the situation in Study II. Furthermore, the experimenter in Study II was himself an undergraduate, while the experimenter in Study I was much older than the subjects and probably more of an authority figure.

One further set of analyses was conducted on other subdivisions of the phrases. These comparisons concerned phrases which made reference to father vs. mother, aggression from others vs. aggression toward others, and homosexual vs. heterosexual content. The only consistent finding was that homosexual phrases received significantly higher scores than heterosexual phrases in Study II with a similar but non-significant difference in Study I (combined $p < .05$ by Stouffer's test).

We have previously discussed the relations among different response modes as individual difference measures. The question still remains whether phrases tend to show any covariance in their power to elicit particular response modes. We have already seen in the section on individual differences that the modes differ in the percentage of signs assigned to them. This relationship is now substantiated in the significant source

TABLE 4
ANALYSES OF VARIANCE ON STIMULUS DIFFERENCES AND RESPONSE MODES

Source	Study I			Study II		
	<i>df</i>	<i>MS</i>	<i>F</i>	<i>df</i>	<i>MS</i>	<i>F</i>
Total	79			199		
Between	15	35.6		39	11.9	
Areas (A)	3	151.0	22.54***	4	62.2	10.20***
Error	12	6.7		35	6.1	
Within	64	32.2		160	15.6	
Modes (M)	4	156.0	6.32***	4	155.0	10.76***
M × A	12	21.1	<1.00	16	9.6	<1.00
Error	48	24.7		120	14.4	

*** $p < .01$.

of variance associated with modes in Table 4. However, when the various modes are correlated, using stimuli as instances, only one significant and consistent finding emerges: Recoding and Interference show a correlation of .335 ($p < .05$) for Study II and of .411 ($p < .10$) for Study I. Phrases which elicit a high degree of Interference also elicit a high number of Recoding responses. Again it seems quite reasonable ex post facto that a phrase which elicits the most severe behavioral disturbance should also tend to elicit a quite primitive psychological defense, one which requires the least involvement on the part of the subject. This relationship was further explored by an investigation of the mean verbal reaction times and mean lengths of responses associated with phrases. It seemed likely that phrases which are most highly threatening, i.e., evoke Interference and Recoding, would also show long reaction times and short responses. In fact, the correlations between Recoding and Interference and mean reaction time for phrases were all positive and statistically significant:

	REACTION TIME	
	Study I	Study II
RECODING	.574 ($p < .02$)	.341 ($p < .05$)
INTERFERENCE	.688 ($p < .01$)	.527 ($p < .01$)

The correlations with Interference are partly due to the inclusion of reaction time measures in the Interference scores.

The relationships with response length (in number of words) are less impressive, though generally in the predicted direction:

	RESPONSE LENGTH	
	Study I	Study II
RECODING	-.554 ($p < .02$)	-.158
INTERFERENCE	.065	-.210

In neither study do we find any significant correlations between the other three response modes and reaction time and response length.

These findings indicate a cluster of characteristics of stimulus phrases consisting of Interference and Recoding responses, long reaction times and, possibly, short responses.

The final question about the stimuli, whether different types of phrases tend to

elicit different defenses, is succinctly answered by Table 4 which shows that in both studies the interaction between defense modes and phrase areas is not an important source of variance. Thus, any differential interaction between areas and response modes is an individual difference phenomenon and is not associated with stimuli.

Phrase Association Test and Group Rorschach

As a further extension of the implications of PT scores the subjects in Study II were given a group Rorschach test. The major interest is in a comparison between the structured verbal PT and the more unstructured perceptual Rorschach. Our primary attention was first to Rorschach responses relevant to the four threat areas tapped by the PT, and second to the distinction between manifest and latent imagery on the Rorschach and its relation to the Phrase Association Test. Table 5 shows the mean number of responses per subject and the percentage of total responses falling into the latent and manifest categories of the four conflict areas. While a sizable number of the total Rorschach responses (36.8%) fell into the four areas, the majority are associated with the Sex category. Since the number of responses associated with Dependency and Competition was so small, they were dropped from further analyses. The large number and percentage of

TABLE 5
MEAN NUMBER OF RORSCHACH RESPONSES AND
PERCENTAGE OF TOTAL NUMBER OF
RESPONSES FOR THE FOUR
THREAT AREAS

Content area	Manifest responses \bar{N} (%)	Latent responses \bar{N} (%)	Total percentage
Sex	1.75 (4.3)	9.14 (22.7)	27.0
Aggression	1.14 (3.1)	1.86 (4.2)	7.3
Dependency	0.11 (0.2)	0.21 (0.8)	1.0
Competition	0.18 (0.5)	0.43 (1.0)	1.5
			36.8

the Sex responses may well be a scorer characteristic since the wealth of literature on sexual imagery may make it difficult for the personality psychologist in mid-twentieth century not to "see" many sexual responses on the Rorschach.

Our first question concerned the relation between the total PT score and some global Rorschach measures. However, total PT score is not related either to total number of Rorschach responses or total number of images (manifest and latent) in the threat areas ($r = -.116$ and $.016$, respectively). The latter relationship remains essentially unchanged when total number of Rorschach responses is held constant.

The major hypothesis we investigated was that an indication of a high degree of anxiety in a particular area (derived from the PT) would be negatively correlated with the appearance of manifest imagery in that area on the Rorschach, but positively correlated with latent imagery. The reasoning was that if obvious sexual or aggressive content is anxiety arousing in the context of the PT then the subject is less likely to use such imagery or responses on the Rorschach. On the other hand, preoccupation with these areas would be expressed in latent imagery. Taking the Sex and Aggression areas separately the data are equivocal. For Aggression the correlation between the PT Aggression scores and manifest aggressive imagery is $-.153$, with latent imagery it is $.259$; for Sex the two correlations are $-.387$ ($p < .05$) and $-.266$, respectively. The relative relation between the two correlations is as predicted and becomes more convincing when the two areas are combined. In that case total manifest sexual and aggressive imagery correlates $-.385$ ($p < .05$) with combined Sex and Aggression PT scores and total latent imagery correlates $.059$ with the combined PT scores. When the total PT scores rather than just the Sex and Aggression scores are used the correlations are $-.449$ ($p < .02$) and $.105$, respectively. Thus there is ground for accepting the hypothesis that anxiety as expressed in the PT is negatively related to the appearance of manifest threatening imagery on the Rorschach; however, it is

unrelated to the appearance of latent imagery.

PHYSIOLOGICAL MEASURES

Autonomic Feedback

One of the major interests in the present study concerns the relation of physiological indices of disturbance or anxiety to verbal, behavioral, and self-rating indices. In two previous studies (Mandler & Kremen, 1958; Mandler et al., 1958) both the Autonomic Perception Questionnaire (APQ) and a postexperimental interview were found to be positively related to physiological activity during an intellectual stress situation. Thus Mandler and Kremen (1958) found that APQ and total autonomic activity correlated $.224$, Interview and autonomic activity correlated $.259$, while APQ and the post-experimental interview correlated $.391$. When a combined APQ and Interview measure was used, the correlation with autonomic activity was $.304$. Thus there was a consistent, though low, relationship between subjects' report of physiological activity and the actual level of that activity.

The first relevant, and surprising, finding in the present study was the absence of a significant relationship between APQ and Interview ($r = -.066$). Even more unexpected was a negative correlation of $-.228$ between the APQ and a summary measure of physiological activity (see below for a detailed discussion of that measure). The Interview score based on the subjects' report of physiological activity obtained immediately after the experimental session was positively related to the sum physiological measure ($r = .317$, $p < .05$). Thus, the major difference in the two studies lies in the failure of the APQ scores to relate either to the Interview or to the physiological activity during the experiment. We shall return to an investigation of this discrepancy after a brief review of the previous findings obtained with the self-reporting scales.

In the Mandler and Kremen study we found that reported perception of visceral activity (APQ) was, as expected, negatively

correlated with the subjects' intellectual functioning on a Vocabulary test ($r = -.270$). However, Vocabulary scores were unrelated to actual physiological activity. Thus perception of autonomic activity and actual autonomic activity seemed to act somewhat independently in their relation to intellectual functioning. This finding led to the suggestion that rather than mere activity and its report we might profitably look at a measure of subjects' hypo- or hypersensitivity to internal bodily events. A measure of Estimation was obtained which ranked subjects on a discrepancy score between their reported autonomic activity and actual activity. A high score on this scale indicates overestimation, i.e., the subject reports more visceral activity than is indicated on his actual record—he might be said to be preoccupied with internal visceral events. Estimation and Vocabulary scores were, in fact, negatively correlated ($r = -.304$), and when actual autonomic activity is held constant by means of the partial correlation technique, this relation remains unchanged ($r = -.317$, $p < .02$). Thus, regardless of actual level of physiological activation there is a relation between tendency to overestimate such activity and low intellectual efficiency.

In contrast to the previous study actual physiological activity was related to verbal performance (total PT score) in the present investigation. As expected, the summary measure of physiological activity and the PT score were positively related to each other ($r = .375$, $p < .05$). However, there is no significant relationship between either the APQ or the Interview and total PT scores ($r = -.242$ and $-.082$, respectively). It will be recalled that the APQ and the sum physiological measure are unrelated in the present study, but that the Interview is positively related to visceral activity. Therefore, the latter was used to derive an Estimation scale for this investigation. For each subject we computed a difference score between his standard score on the Interview scale and his standard score on the sum physiological measure; thus a high score on this scale indicates overestimation, a low score underestimation of actual visceral ac-

tivity. When this measure is related to PT performance the resultant $r = -.380$, i.e., subjects who overestimate tend to show less disturbance on the phrases than subjects who underestimate. However, when autonomic activity is held constant this correlation drops to a nonsignificant $-.217$; when the Interview score is partialled out the correlation rises to $-.463$ ($p < .01$).³ The Estimation-PT score relationship therefore seems to be relatively independent of Interview scores, i.e., independent of cognitive report.

We can now contrast the discrepancies between the present investigation on an affective task and the Mandler and Kremen study using an intellectual task. In the intellectual task, Estimation is positively related to interference regardless of autonomic discharge; in the affective task, Estimation is negatively related to disturbance regardless of level of cognitive awareness. Thus, subjects who are high on cognitive preoccupation with visceral events do poorly on an intellectual task independently of their actual autonomic activity; the greater the cognitive preoccupation the more likely it is that a subject will be rated as overestimating and the more poorly he will do on the task. On the other hand, subjects who show a high degree of visceral activity will more likely be rated as underestimators, and also show disturbance on an affective task.

This differential importance of cognitive and visceral activity in the two kinds of tasks can be further illuminated by considering the relation between the two report scales. While APQ and Interview were positively related in the intellectual situation, they are unrelated in the affective task. The kinds of things a subject says about his habitual awareness of visceral events appear—for our college population—to be more directly related to intellectual than to

³ We might note that even though the APQ and physiological activity are unrelated, an Estimation scale based on the APQ as a measure of cognitive awareness produces results highly similar to those obtained with the interview. The relevant correlations are: Estimation vs. PT score $-.394$; with physiological activity held constant, $r = -.174$, with APQ held constant $r = -.339$.

affective situations. This is further borne out by the lack of relation between APQ and the physiological measure. When subjects report habitual visceral activity they do not seem to use situations such as the Phrase Association Test as a reference point. When subjects are specifically questioned about the situation, however—as in the postexperimental Interview—the relations found for intellectual tasks reappear. What is more important, however, is the apparent differential relevance of cognitive and visceral factors in the two situations.

The other self-report scale, the Manifest Anxiety scale (*MA*), yielded relations to the report measures comparable with the Mandler and Kremen study. The correlation between APQ and *MA* is .262 (.267 in the previous study), between *MA* and Interview .298 (as against .199). *MA* and Estimation are positively correlated ($r = .145$) and this relation is statistically significant when actual visceral activity is held constant ($r = .304, p < .05$). The same finding was obtained in the Mandler and Kremen study (the two correlations were .284 and .325, respectively) and supports the notion that "high anxiety-scale scores are related to the tendency to overestimate visceral discharge." We shall have occasion to refer to the relations among the Manifest Anxiety scale, the Phrase Association Test, and physiological measures below.

General Physiological Activity and Verbal Anxiety Measures

The summary measure of physiological activity referred to in the last section con-

sisted, for each subject, of the sum of the standard scores on 9 of the 11 physiological measures described in the Method section. The two measures which were not included were the two GSR measures. The rationale for this exclusion was based on the following finding.

In examining the correlation matrix for the 11 physiological measures (Appendix E) we noted that of the 55 correlation coefficients 19 were negative. Twelve of these 19 negative correlations were contributed by the two GSR measures. It seems reasonable to conclude from this finding that in computing a general measure of physiological activity these two measures should be excluded since they apparently indicate an aspect of activity which is different from the general visceral activity—mainly cardiovascular—derived from the other measures. In Table 6 we have presented the correlations between our three self-report measures, the total PT score, and four different indices of general physiological activity. The first measure is the one just discussed, the second is the sum of all 11 channels—including the GSR measures. The third and fourth measures are based on an argument by Lacey and Lacey (1958) and derived from the notion of response specificity; this type of index uses the highest standard score for each subject in whatever channel it is found. Thus, for one subject the highest standard score may be on a heart rate measure, for another it may be on peripheral blood flow, and so forth. The third measure excludes the two GSR channels from this analysis, the fourth measure includes them.

TABLE 6
PRODUCT-MOMENT CORRELATIONS AMONG VARIOUS MEASURES OF PHYSIOLOGICAL ACTIVITY AND
VERBAL MEASURES OF ANXIETY

Verbal measure	Sum physiological without GSR	Sum physiological with GSR	Highest specific without GSR	Highest specific with GSR
PT score	.325 (.05)	.182	.270	-.027
APQ	-.228	-.147	.007	.159
<i>MA</i>	.055	.236	.416 (.01)	.599 (.01)
Interview	.317 (.10)	.304 (.10)	.343 (.05)	.157

Several interesting results appear in Table 6. We have already had occasion to discuss the relation among PT scores, APQ scores, Interview scores, and physiological activity. As indicated above, the PT score is most efficiently predicted from a summary measure which excludes the GSR variables, while the APQ is negatively related to the same measure. The Interview shows a general positive relation with all of the measures used, though again the highest correlations are obtained when the GSR is excluded. The most striking discrepancy is found with the *MA* scores which fail to show any relation with the first summary measure, but very high correlations with the two specificity measures.

We would offer the following interpretation for these findings. In light of the lack of consistency between the GSR and the other physiological indices it might be useful to distinguish between two processes: emotionality and activation. Rather than forming a conjunction of these two processes (cf. Duffy, 1957) we would argue that while emotionality usually implies activation, activation need not necessarily be accompanied by emotionality. Considering the GSR as a measure of activation (cf. Woodworth & Schlosberg, 1954, pp. 144-159) and the other measures as an index of emotionality, these findings may be seen to be fairly consistent. As far as the specificity measures are concerned, we would argue that they are more in the activation than in the emotionality area; they measure a subject's highest level of activity and may thus be an index of highest activation of the subject, wherever it occurs.

In line with these notions, we would argue that PT scores are indices of emotionality rather than activation; they show subjects' disturbance in the presence of threatening material. Thus, PT scores are more directly related to the first summary measure than the others. The Interview scores are specific reports by the subjects of relevant body-perceptions, and the positive correlations provide an index of the reliability of such reports. We have already seen that these reports on the APQ, however, are probably not related by the sub-

jects to the test situation used in this study. As a scale of habitual anxiety reactions the APQ is probably more closely related to the *MA*. While in the present study the correlation between APQ and *MA* is only a non-significant .262, it has ranged from .27 to .52 in our previous studies. It might be noted here that the *MA* is correlated .596 and .361 with the two GSR measures individually, while the "emotional" PT scores are correlated -.342 and -.504 with the GSR measures. Thus, considering the GSR and the specificity measures as more directly related to activation, it seems reasonable to conclude that the *MA* is, in this situation, a quite good measure of activation. This finding is consistent with the general theoretical basis underlying the use of this scale as a measure of individual differences in drive. Theoretically we would argue that the anxiety dimension can be divided into at least two components, one of emotionality and one of activation or drive. Whenever these two dimensions are elicited in a subject he is likely to show high "anxiety" scores on the *MA* as well as on other measures, but measures of emotionality—such as the PT—need not be, and in this case are not correlated with *MA* ($r = .125$). On the other hand, individual differences on the *MA* are likely to differentiate subjects on a drive or activation dimension, if not on emotionality.

Relations among Individual Differences in Physiological Activity, Areas of Threat, and Response Modes

We have already noted that high PT scores are associated with high over-all physiological activity. It remains to examine the relations among individual differences in the threat areas, response modes, and physiological activity. As before, the measure of physiological activity will be the summary measure without the GSR measures.

The correlations between this measure and subjects' scores in the four areas follow:

NEUTRAL	.137
AGGRESSION	.396 ($p < .05$)
SEX	.409 ($p < .02$)
DEPENDENCY	.232

Thus, variations in level of verbal disturbance in response to Neutral and Dependency phrases are not associated with variations in visceral arousal, while both Sex and Aggression are significantly associated with it. Two of our indices of anxiety—verbal disturbance score and physiological arousal—show parallel individual differences for the two classic areas of threat, but not for the Dependency area.

When we examine the relation between these areas and individual channels of physiological response, two physiological indices are of particular interest, GSR and temperature.

Consistent with our previous discussion, PT scores on all four areas are negatively correlated with both GSR scores. The relevant correlations range from $-.303$ between Neutral and GSR₁ to $-.425$ between Sex and GSR₂.

On the basis of some evidence in the literature (e.g., Mittleman & Wolff, 1943) we hypothesized that subjects who show high degrees of anxiety in the area of Aggression would tend to show decreases in finger temperature, while subjects who were concerned with sexual problems would show increases in temperature. It will be recalled that one of our temperature measures (T_1) is an index of mean temperature rise, while another (T_2) is an index of mean temperature decrease. The relation between these two measures and scores on the Aggression and Sex areas is shown below:

	T_1	T_2
AGGRESSION	.272	.401 ($p < .02$)
SEX	.445 ($p < .02$)	.148

As predicted, we find significant positive relations between Aggression and T_1 and between Sex and T_2 . Thus the temperature phenomenon usually associated with sexual arousal is generally true for subjects with conflicts in the sexual area; that associated with aggression describes the temperature behavior of subjects with aggressive conflicts in our task.

In pursuing these relations further we noted that these two temperature indices are also positively associated with two of the response modes. Avoidance and temperature decreases are correlated .497, while

Interference and temperature rises correlate .374. In the case of temperature decreases we seem to encounter a triad with Avoidance and Aggression, having previously found a correlation between the last two of .463. In exploring some possible causal relations among these three variables we resorted to partial correlational analysis. When Aggression is partialled out, the correlation between temperature and Avoidance drops only slightly to .326; however, when Avoidance is partialled out the relation between temperature and Aggression disappears ($r = .064$). Thus, it is likely that avoidance responding leads both to anxiety over aggression and to the drop in temperature. Possibly the avoidance responses which represent a refusal to do the task may be viewed as aggressive in nature and this aggression toward the experimenter leads to increased anxiety over the aggressive stimuli and the resultant drop in finger temperature. In the case of temperature increases an exploration of the triad with Sex and Interference suggests, though less strongly, that preoccupation with sexual problems leads to interference and to temperature rises. The partial correlation between temperature and Interference drops to .101 with Sex held constant, while the partial correlation between temperature and Sex also drops to .277 with Interference held constant. These analyses suggest that while Aggression scores may be situationally determined, the Sex scores are more likely to be more pervasive personality characteristics.

We turn now to the relation between response modes and physiological activity. The prediction was made that the three specific defensive modes (Recoding, Rationalization, and Personalization) should be differentially effective in preventing visceral discharge. According to our classification of response modes, subjects who recode, in effect, avoid the meaning of the threatening material. If successful, such recoding should result in lower physiological "anxiety." Similarly, Rationalization and Personalization should—according to our rationale of increasing personal involvement—lead to increasing physiological activity. Of the

other two modes, Interference—as an independent sign of high degrees of disorganization—should be associated with a high degree of physiological activity, while Avoidance—as a pervasive anxiety response to the task—should probably also be associated with a high degree of visceral anxiety. Three indices were used to explore these relationships. The first is the average correlation between each response mode and nine physiological indices (excluding GSR), the second is the correlation between each response mode and the summary physiological measure, and the third is the mean summary physiological activity measure for the five subjects highest in each of the response modes. These data are shown in Table 7. As far as the three specific defensive modes are concerned the data generally bear out our predictions. The two correlational measures show negative correlations between physiological activity and Recoding and a positive correlation for the other two modes. Similarly the mean physiological score for the subjects highest on Recoding is lower than the score for the subjects in the other two modes. Statistical evaluation of the average correlational measure (analysis of variance performed on z scores) shows a significant variation among response modes ($F = 8.98, p < .01$); on the second correlational technique separate t tests indicate that the correlation with Recoding is significantly different from the other correlations which do not differ significantly from each other; the analysis of variance for the mean physiological measures is not statistically significant. It might be noted in addition that for all three anal-

yses Interference is most strongly associated with physiological activity, while Avoidance is next highest. These data bear out our major prediction that Recoding as a defensive mode should be associated with low physiological activity. They lend further support to the utility of the Phrase Association Test and the scoring methods employed.

Stimulus Differences and Physiological Arousal

The final analyses concern differences among stimuli in the degree to which they arouse physiological activity in our subjects. The first question asks whether the different areas—types of stimuli—differ in the degree to which they elicit physiological responses. Once again we used a composite measure based on the sum of standard scores for each stimulus of the eight physiological indices for stimuli described in the Method section. In the case of the stimuli we included the GSR measure since it did not show the pattern of negative correlations with other physiological measures which we found for the subject population. The means for the four areas on this summary measure are shown below:

NEUTRAL	AGGRESSION	SEX	DEPENDENCY
6.67	10.75	13.00	12.00

An analysis of variance indicated significant variation among the four areas ($F = 6.70, p < .05$). However, Tukey's gap test permits us to state only that the Neutral phrases differ significantly from the other three, which in turn are not significantly different from one another.

TABLE 7
RELATIONS BETWEEN RESPONSE MODES AND TOTAL PHYSIOLOGICAL RESPONSE

	Recoding	Rationalization	Personalization	Avoidance	Interference
Average correlation with physiological indices	-.126	.142	.128	.223	.241
Correlation with physiological summary measure	-.219	.240	.242	.391 (.05)	.424 (.02)
Mean physiological response of five highest subjects	12.6	16.6	17.6	20.2	20.8

It will be recalled that three blank stimuli were introduced into the series of phrases in order to check on the possibility of a conditioned physiological response to projector noise and stimulus changes. An analysis of the mean response to the three blank stimuli indicated that in no case was there a rise in response from the first to the last blank, which would have indicated conditioning. The physiological responses to the blanks either decreased or showed no change across time. In all cases the mean response to the blank stimuli was less than the mean response to the neutral stimuli.

Having substantiated that reliable differences exist between neutral and threat materials as far as physiological response is concerned, we now inquire whether there is a relation between the physiological and verbal response to stimuli. The correlation between mean PT score and the summary physiological measure for stimuli is .715. Thus there is a strong association between the amount of verbal disturbance a stimulus elicits and the degree of physiological response to it.

In contrast to the subject correlations on response modes we find a significant *positive* correlation for the summary physiological measure with Recoding ($r = .469, p < .05$), as well as a positive correlation with Interference ($r = .524, p < .05$).⁴ Thus phrases which tend to elicit recoding responses also elicit a high degree of physiological response. This is in contrast to subjects, where a high degree of recoding is related to low physiological responding. This juxtaposition nicely illustrates the distinction between stimulus and subject correlations. What is likely to be the case for stimuli is that those phrases which are most threatening elicit a high degree of physiological response from some subjects, but that subjects who tend to use Recoding as a major mode of defense will use it most frequently with these same threatening stimuli. Thus a high degree of threat in a stimulus can, on the average, result in visceral anxiety,

extreme verbal disturbance (Interference), and a potent defense, even though for individuals the recoding defense and the visceral discharge appear to operate alternatively.

Adding these findings to our previous observations on stimulus differences we can characterize the cluster of highly correlated stimulus effects as consisting of long reaction times, extreme verbal disturbance, high visceral activity, and primitive defenses involving recoding and denial. These characteristics confirm what are commonly postulated as typical effects of high degrees of threat and stress.

SUMMARY AND CONCLUSIONS

In these studies we have explored relations among various modes of verbal response to threat, differences among types of threat areas, and physiological response to them. In undertaking a comparison between two widely used indices of anxiety—verbal disorganization and visceral response—we have been able to make effective use of a new research tool: Heath's Phrase Association Test. Using a 29-item checklist of subjects' response to neutral and threatening phrases various findings substantiated the validity of this test. Our major findings may be summarized as follows:

1. The verbal response measures reliably differentiated between various areas of threat—defined by phrase content—and in particular between neutral phrases and phrases with threat content.

2. Physiological response also differentiated neutral from threatening stimulus items.

3. Modes of response—using a five category classification of the signs of disorganization—showed reliable relations among one another. The findings substantiated a theoretical approach to verbal response which emphasized degree of personal involvement on the part of the subject. This was particularly apparent in the degree to which subjects who successfully avoid personal involvement also show less physiological response to the stimuli.

⁴ The other three response modes are not significantly related to the physiological measure.

4. The method showed some promising results in an attempt to distinguish between generalized anxiety evoked by the test situation and specific anxiety reactions to particular kinds of stimuli.

5. Individual differences in modes of response were contrasted with differences among stimuli and their tendencies to evoke different kinds of response modes. The major finding here was the identification of a cluster consisting of behavioral interference, recoding or denial of meaning, high degree of physiological response, and long reaction times, all of which are apparently elicited by the same kinds of stimuli.

6. By comparison with a previous study we concluded that a distinction can be made between reactions to intellectual and to affective threat. Intellectual tasks apparently are more likely to be disrupted by subjects' perceptions of and preoccupation with bodily events, while affective tasks—such as the Phrase Association Test—show disorganization to be more dependent on actual physiological involvement.

7. An analysis of self-report scales and various physiological measures suggested a preliminary distinction between two components of the anxiety syndrome: activation and emotionality. Activation is associated with individual differences in the galvanic skin response and scores on Taylor's Manifest Anxiety scale. Emotionality is associated with signs of verbal disorganization, situational awareness of bodily reactions, and physiological arousal in channels other than the GSR. As a measure of individual differences, GSR measures tend to correlate negatively with other physiological indices.

8. We were able to substantiate suggestions from the literature that concern with sexual and aggressive problems is differentially associated with temperature increases and decreases, respectively.

9. Results from a group Rorschach suggest that subjects who show a high degree of anxiety on the Phrase Association Test will tend to use less manifest sexual and aggressive imagery on the Rorschach than subjects low in anxiety.

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APPENDIX A

PHRASES FOR STUDY I

Neutral

- N₁. The horses worked well together
- N₂. Steel company made new equipment
- N₃. Farmer dug a new well
- N₄. Tugs helped ships reach port
- N₅. Children given free summer camp
- N₆. Architects planned home for family

Aggression

- A₁. Father convicted for torturing son
- A₂. Boy beat mother into unconsciousness
- A₃. Mother burned baby in bath
- A₄. He suddenly struck his father

Sex

- S₁. Two male monkeys sexually embraced
- S₂. Prostitutes do anything men desire
- S₃. Female monkey tried mating male
- S₄. He enjoys sleeping with men

Dependency

- D₁. Mother bears desert baby cubs
- D₂. Father neglects his sick child
- D₃. Father lions desert their cubs
- D₄. Mother sent neglected child away

APPENDIX B

PHRASES FOR STUDY II

Neutral

- N₁. Architects planned home for family
- N₂. He built his own boat
- N₃. Circus gave them free passes
- N₄. The craftsman designed new ornaments
- N₅. The dairy farm bought cows
- N₆. The horses worked well together
- N₇. He overhauled the old motor
- N₈. Steel company made new equipment

*Aggression**Against*

- A₁. He suddenly struck his father
- A₂. He spit in his mother's face
- A₃. Boy beat sister into unconsciousness
- A₄. He beat up his roommate

From

- A₅. Father convicted for torturing son
- A₆. Mother brutally beat her child
- A₇. His brother kicked him in the stomach
- A₈. Student attacked by gang

*Sex**Hetero*

- S₁. His girl friend is very promiscuous
- S₂. He propositioned the waitress
- S₃. After the operation he was impotent
- S₄. The prostitute slept with the student

Homo

- S₅. He enjoys sleeping with men
- S₆. Homosexuals are easily recognized
- S₇. He likes watching nude men
- S₈. His roommate made a pass at him

*Dependency**Rejection*

- D₁. Father neglects his sick child
- D₂. She deserted her baby boy
- D₃. His brother refused to help
- D₄. His roommate would not loan him money

Subjugation

- D₅. He pleaded with his father
- D₆. His mother had to support him
- D₇. His sister had to protect him
- D₈. He needed help with his homework

Competition

- C₁. He lost the game to his father
- C₂. His mother is smarter than he
- C₃. His brother is more popular than he
- C₄. He just missed the dean's list
- C₅. He did not fulfill his father's hopes
- C₆. His mother was disappointed with his grades
- C₇. He did not get the promotion
- C₈. He failed to make any team

APPENDIX C

SCORING MANUAL FOR THE PHRASE ASSOCIATION TEST

I. Avoidance

1. Comment on wording or phrasing, reference to task or to other phrases, explicit or implicit (e.g., "These are all bad guys," "It looks like a headline").

2. Comment on physical aspects of stimulus material.

3. Asks for repetition of phrase.

4. Gives no substantive response, or says he cannot think of response (whether or not he gives a response).

5. Denies own response or questions its adequacy (e.g., "No," "I meant . . .").

6. Simple repetition of stimulus or restatement without addition of new content—may be synonymous expression. Major content of phrases must be restated in order to score. Also score if subject adds only "Why?" to repetition of phrase.

7. Repeats exactly one or two words of the stimulus only.

8. One of three shortest reaction times in record, unless there are ties.

II. Interference

9. More than one response, even if only fragmentary or if one of the responses is non-substantive. Do not score if second response is a simple elaboration of the first, but always score if there is clearly more than a one-phrase response. Do not score enumerations.

10. Response is unfinished or broken.

11. Repeats own response (one word or more).

12. Change in length from other responses: the longest (shortest) response is at least twice (no more than half) as long as the next longest (shortest). Or response is one of two (but not more) which fulfill this criterion.

13. Gives one-word substantive response or two responses which each consist of a single word.

14. Laughs or sighs.

15. One of three longest reaction times for substantive responses. Also score for absence of a substantive response.

III. Recoding

16. Misinterpretation or nonsense response.

17. Evasion. Evades central notion of stimulus by giving irrelevant or tangential response

which has some connection with the stimulus. Major criterion is evasion of central meaning of the stimulus phrase, a failure to take into account the essential communication of the phrase. Also score if no substantive response.

18. Reversal of meaning, e.g., from "a does to b" to "b does to a" or from "a hates b" to "a loves b." Also score if inserts positive qualities for actor engaged in reprehensible deed.

19. Criticizes or questions clarity of meaning (e.g., "I don't understand that sentence").

20. Denial of truth of phrase, explicit ("People don't act that way") or implicit (from "a does x" to "b does not do x"). Explicit or implicit denial of stimulus or its consequences for the responder ("It doesn't matter," "My mother wouldn't").

21. Intensification or approval of deviant behavior. Frequently this changes meaning by making phrase seem ridiculously extreme—an undoing by intensification (e.g., "And then he raped her," "So what!" "Good!").

IV. Rationalization

22. Response is in the form of a question.

23. Questions rather than denies the validity of the stimulus phrase. Expresses doubt rather than disbelief (e.g., "I wonder," "Does that really happen?").

24. Justifies or defends central theme of phrase by invoking psychological motives such as character structure ("He was weak, abnormal") or by inventing sufficient psychological causes for the act. Also score if asks for such an explanation or cause for the act or shifts responsibility within the phrase.

25. Reference to norm, e.g., "x is usual, typical, common." Justification by reference to norm.

26. Introduction of characters, other than subject's family or friends.

V. Personalization

27. Reference to self or family or name of friends or acquaintances.

28. Any emotional reaction to statement; any value, ethical, or moral judgment. Must be clearcut in terms of our cultural norms, not just descriptive adjectives such as "smart."

29. Affect or value judgment is attributed to actor in phrase.





